AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

1. (**Currently Amended**) A method for estimating, by a terrain navigational system of a moving vehicle with limited maneuverability, curvilinear distances to be traversed by the vehicle from its instantaneous position to reach points of a travel region containing potential obstacles to be circumvented by said vehicle in order to establish a distance map covering the travel region wherein the curvilinear distance estimations of the distance map are obtained by means of a distance transform ~~by propagation~~ ~~taking into account~~, the method comprising the steps of:

providing a virtual, impassible obstacle in addition to detected real impassable obstacles;

arranging the virtual, impassible obstacle in a predetermined spatial position with respect to the vehicle;

moving the virtual, impassible obstacle in a predetermined relationship respect to the vehicle;

cataloging distance map cells which are associated with the virtual, impassible obstacle that are inaccessible to the vehicle owing to its maneuverability limits;

forcing the distance transform to put aside, in its search for the lengths of the shortest paths, the paths that are out of range of the vehicle owing to its limited maneuverability; and

plotting a course which prohibits unrealistic vehicle turns based on the paths that are out of range of the vehicle owing to its limited maneuverability

~~besides the potential obstacles to be circumvented, an additional obstacle to be circumvented, placed in the neighborhood of the vehicle, linked to the vehicle and locating areas of the near neighborhood of the craft considered to be inaccessible to the craft owing to its limited maneuverability~~.

2. (**Currently Amended**) The method as claimed in claim 1, wherein the ~~additional~~ virtual, impassible obstacle is of concave shape and disposed in the neighborhood of the instantaneous

position of the vehicle<u>,</u> the concavity being turned into [[the]] <u>a</u> direction of [[the]] <u>a</u> motion of the vehicle and encompasses the instantaneous position of the vehicle.

3. (**Withdrawn-Currently Amended**) The method as claimed in claim 1, wherein the ~~additional~~ <u>virtual, impassible</u> obstacle is U-shaped, the opening of the U being turned into the direction of [[the]] <u>a</u> motion of the vehicle and encompassing [[the]] <u>an</u> instantaneous position of the vehicle.

4. (**Withdrawn-Currently Amended**) The method as claimed in claim 1, wherein the ~~additional~~ <u>virtual, impassible</u> obstacle has a half-moon shape, [[the]] <u>an</u> opening of the half-moon being turned ~~into the~~ <u>in a</u> direction of [[the]] motion of the vehicle and encompassing [[the]] <u>an</u> instantaneous position of the vehicle.

5. (**Withdrawn-Currently Amended**) The method as claimed in claim 1, wherein the ~~additional~~ <u>virtual, impassible</u> obstacle has a dual-lobed butterfly-wing shape, placed on either side of [[the]] <u>an</u> instantaneous position of the craft and having a common tangent oriented in [[the]] <u>a</u> direction of motion of the craft.

6. (**Currently Amended**) The method as claimed in claim 1, wherein when the <u>vehicle</u> is an aircraft, the contour of the ~~additional~~ <u>virtual, impassible</u> obstacle comprises parts corresponding to [[the]] ground projections of two circles <u>passing through the position of the aircraft</u>, having a radius equal to [[the]] <u>a</u> radius of curvature of [[the]] <u>a</u> tightest turn allowed for the aircraft at the time being considered.

7. (**Currently Amended**) The method as claimed in claim 1, wherein when the ~~craft~~ vehicle is an aircraft subject to a cross-wind, [[the]] <u>a</u> contour of the ~~additional~~ <u>virtual, impassible</u> obstacle comprises parts of a cycloid corresponding to [[the]] ground projections of two circles associated with the aircraft, having a radius equal to [[the]] <u>a</u> radius of curvature of [[the]] <u>a</u> tightest turn allowed for the aircraft at the time being considered.

8. (**Withdrawn-Currently Amended**) The method as claimed in claim 1, wherein, when the <u>vehicle</u> is an aircraft subject to a cross-wind, [[the]] <u>a</u> contour of the ~~additional~~ <u>virtual, impassible</u>

obstacle consists of two lobes of a cycloid limited to their parts going from their starting point, which is [[the]] an instantaneous position of the aircraft, to their second intersection with [[the]] straight lines going from the instantaneous position of the aircraft to virtual positions on the cycloid lobes corresponding, for the aircraft, to an arbitrary track modification angle.

9. (**Withdrawn-Currently Amended**) The method as claimed in claim 1, wherein when the vehicle is an aircraft subject to a cross-wind, [[the]] a contour of the ~~additional~~ virtual, impassible obstacle consists of two lobes of a cycloid limited to their parts going from their starting point, which is [[the]] an instantaneous position of the aircraft, to their second intersection with [[the]] straight lines going from the instantaneous position of the aircraft to virtual positions on the cycloid lobes corresponding, for the aircraft, to a track modification angle of 180 degrees.

10. (**Currently Amended**) The method as claimed in claim 1, wherein when the [[craft]] vehicle is an aircraft subject to a cross-wind and the distance map is established within a geographical reference frame using longitudes and latitudes, [[the]] a contour of the additional obstacle has two parts in the form of cycloid lobes obeying [[the]] a system of parametric equations:

$$\begin{pmatrix} x \\ y \end{pmatrix}_g = \begin{pmatrix} WS_{Xg}.t - \delta.R.\cos(wt + \gamma_g) + C_{Xg} \\ WS_{Yg}.t + R.\sin(wt + \gamma_g) + C_{Yg} \end{pmatrix}$$

x and y being [[the]] abscissae and ordinates of a point in [[the]] a geographical reference frame of the distance map,

$\begin{pmatrix} WS_X \\ WS_Y \end{pmatrix}$ being [[the]] a wind vector expressed in the geographical reference frame of the distance map,

with

$$R = \frac{TAS^2}{g.\tan\varphi_{roll}}$$

$$w = \frac{TAS}{R} = \frac{g.\tan\varphi_{roll}}{TAS}$$

TAS being [[the]] an amplitude of [[the]] an airspeed of the aircraft,

φ_{roll} being [[the]] a roll angle of the aircraft during [[the]] a maneuver,
γ being a factor that depends on [[the]] initial conditions,
δ being a coefficient equal to +1 for a right turn and -1 for a left turn, and
with

$$C_{Xg} = Long + \delta.R.\cos(\gamma_g)$$

$$C_{Yg} = Lat - R.\sin(\gamma_g)$$

$$\gamma_g = \delta.Heading + k.\Pi$$

Long being [[the]] a longitude of the instantaneous position of the aircraft,
Lat being [[the]] a latitude of the instantaneous position of the aircraft, and
Heading being [[the]] a flight direction of the aircraft.

11. (**Currently Amended**) The method as claimed in claim 1, wherein the ~~additional~~ virtual, impassible obstacle taking into account [[the]] maneuverability limits of the craft is missing [[the]] a surface area of a free angular sector starting from the [[craft]] vehicle and having its opening turned into [[the]] a direction of motion of the [[craft]] vehicle.

12. (**Currently Amended**) The method as claimed in claim 11, wherein, when the distance map takes the form of a grid of cells corresponding to the elements of a database of elevation of the terrain covering the area of travel of the [[craft]] vehicle, the ~~additional~~ virtual, impassible obstacle taking into account [[the]] maneuverability limits of the [[craft]] vehicle is missing the cells that are totally or partially covered by [[the]] a free angular sector.

13. (**Currently Amended**) The method as claimed in claim 11, wherein, when the distance map results from an application, to the pixels of an image formed by a map taken from a database of elevation of the terrain, of a distance transform that uses a chamfer mask cataloging the distances of a pixel under analysis with respect to [[the]] nearest pixels, called pixels of the neighborhood, and that has axes of propagation oriented in [[the]] directions of the pixels of the neighborhood with respect to the pixel under analysis in the chamfer mask, the free angular sector has its opening oriented along the axis of propagation nearest to the direction of motion of the craft.

14. (**Currently Amended**) The method as claimed in claim 12, wherein the free angular sector of propagation is bounded by bisectors of [[the]] angles formed by [[the]] axes of propagation.